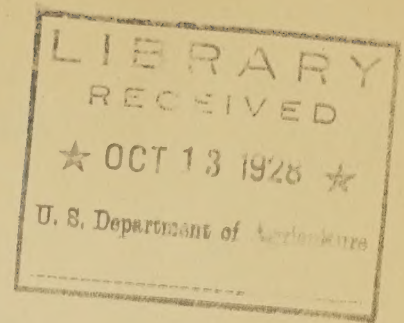


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A summary of the Exhibit.

DOES DOUBLE DUTY

The dairy-herd improvement association performs a double duty: first, it tests the cows for economical production of milk and butterfat; and second, it proves the sires by comparing the yearly production records of the daughters of each sire with the yearly production records of their dams. Through this comparison of the records of dams and daughters, the sires are tested with as great a degree of accuracy as the cows themselves. On the basis of production records, inferior cows and inferior bulls are culled out and discarded from our dairy herds.

Back of a window in this exhibit appears in rotation four different farms, each of which represents some typical accomplishment of the cow tester employed by the dairy-herd improvement association. On the left of this exhibit the observer is invited to verify his judgment in selecting high-producing dairy cows. After he has made his choice from the photographs of five cows which are offered for selection, he presses a button and the records of these cows appear. On the right of the exhibit the observer may prove his ability in selecting bulls which will transmit high production, and his success may be measured by again pressing a button which brings to light the comparison of the yearly production records of the daughters of each bull with the yearly production records of their dams.

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A Summary of the Exhibit

TRANSMITTING ABILITY OF DAIRY SIRES

Those who regard themselves as good judges of dairy sires will have an opportunity to test their ability in the exhibit entitled "Transmitting Ability of Dairy Sires". At the entrance of this exhibit is a structure on which are seventeen miniature bulls standing on what appears to be the tan bark of the show ring. The visitor is handed a placing card, and after looking the bulls over he places the animals on four points as follows:

1. The bull that will sire the highest producing daughters.
2. The bull whose daughters will make the greatest increase in yield over their dams.
3. The bull within the breed which will sire the highest butterfat-testing daughters.
4. The bull that will transmit the best type.

On the inside of the exhibit is the actual proof of the merit of these sires. Each sire's photograph is shown again at the top of a section on the walls of the exhibit, and just below are his daughters and their dams. The record of each animal is shown. All of these bulls were tested in herds owned by the Bureau of Dairy Industry or by cooperators.

This exhibit brings out the fact that the breeding ability of a bull for either type or production can be determined only by actual breeding test, that is, by the merit of his daughters and sons, and not by his appearance.

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A Summary of the Exhibit

THREE PLANES OF FEEDING

Three piles of feed, of different heights, represent three planes of feeding tried out on dairy cows at the Huntley, Montana, Dairy Experiment Station, of the Department of Agriculture. In one pile of feed we see only pasture, hay, and silage; in the next pile we see the pasture, hay, and silage plus a limited amount of grain; and in the third pile there is practically the same amount of roughage plus a large amount of grain. In the rear of these piles of feed is a picture of the group of cows used in this experiment. During one lactation period the cows received the roughage rations; during a second lactation period they were fed roughage plus one pound of grain to each six pounds of milk produced; and during a third lactation period they were fed the same roughage plus one pound of grain mixture to each three pounds of milk produced.

All the cows were milked three times a day. The pasture consisted of irrigated tame grass; alfalfa was the only hay used; and corn silage furnished the remainder of the roughage ration. The results show that cows of more than average producing ability have sufficient capacity to consume enough nutrient for their needs from roughage alone provided the roughage is of the highest quality. In these experiments the cows on roughage alone produced milk and butterfat at lowest feed cost; while on the full grain ration the cows produced the largest quantity of milk and butterfat. At the cost of feeds and the returns for products that prevailed at Huntley, however, the cows were most profitable when on the limited grain ration.

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A Summary of the Exhibits

BITTER WEED

"Bitter weed causes enormous losses each year due to unmarketable milk," is the message which appears on a giant milk can which forms the center of this exhibit. In front of this can are pictured the steps necessary to be taken in getting rid of bitter weed in pastures.

The sour milk problem has long been recognized and steps have been taken to prevent its attendant losses. It is too rarely recognized, however, that the production of milk containing weed flavors is causing an annual loss probably as great as that caused by sour milk. One of these weeds is bitter weed.

Bitter weed is an erect annual plant from 10 to 24 or more inches in height with a slender stem, usually much branched and with numerous very narrow almost branchlike leaves. Showy flower heads are yellow and from about three-fourths to one inch in diameter. This plant is most abundant from Virginia and Missouri to Florida and Texas, although it is found occasionally farther north. In the South it is the common weed of pastures and roadsides.

Bitter weed when eaten by a dairy cow gives a bitter astringent taste to the milk produced. In many cases the bitterness is so intense that the milk is not fit for human food. As this plant is abundant in large areas of the Southern States, losses from this cause are sometimes very great.

Specimens of the bitter weed are displayed in the exhibit and methods of making some use of the milk from cows that have eaten bitter weed are suggested.

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A Summary of the Exhibit:

DAIRY BY-PRODUCTS

Millions of dollars of wealth could be created if the enormous quantities of skim milk, buttermilk, and whey which are produced each year in the United States could be utilized more efficiently. This fact is emphasized in the exhibit by a river of skim milk which flows over a falls, only a part of which is diverted into factories and made into useful products.

On one side of the center feature are shown some of the more recent results of research on the problem of economic utilization of the products mentioned. By means of pictures and charts it is shown that there is an optimum heat treatment which skim milk should receive before it is converted into a powder to be used in making bread and ice cream.

On the other side of the exhibit is a panel which describes briefly important factors in the manufacture of commercial buttermilk and concentrated sour skim milk. Suitable curves are used to show that the temperature employed in pasteurizing skim milk has a pronounced effect on the viscosity but not on the stability of commercial buttermilk. An important factor in manufacturing concentrated sour skim milk for use in baking is to get the proper amount of acid in the finished product, since the acid content of the finished product has a definite relation to its keeping quality and value for baking.

September 15, 1928.

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A Summary of the Exhibit

THE MILK FACTORY

That the inside of the cow is the darkest place on earth is a popular way of expressing the thought that very little is known of what goes on inside the cow in the process of milk production.

Observation and research, however, have brought to light a number of interesting facts concerning the process of making milk. These facts are illustrated in a general way in this exhibit by means of a cow six feet high whose stomach, intestines, udder, heart, etc. are pictured as parts of a milk factory, and the various organs as well as their functions are compared to similar machines in a manufacturing plant.

This cow, whose name is Belle, is equipped with a real voice produced by means of a special phonograph record and amplifiers. She explains the whole process of milk production to her owner in an effort to convince him that she must have a balanced ration in order to produce milk economically. Belle says "A cow makes milk of certain ingredients, according to a definite formula. The principal ingredients are proteins, carbohydrates, fats, minerals, and vitamins, and a certain proportion of each must be fed. If one or more of these ingredients are missing in my feed I cannot produce much milk, because I must have enough for my body first and what is left goes for milk production. This explains why a balanced ration containing these elements in the right proportion and in sufficient quantity should be fed to dairy cows." "And another thing", says Belle, "notice that the pumping system or heart keeps the process moving. A milk factory must have a strong pump, strong purifying system, and mixing, breaking, and sifting rooms of large capacity to handle large quantities of feed and make a great deal of milk. These things are important, but in themselves are not sufficient without the inheritance of the necessary impulse to utilize them to best advantage for milk production."

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A Summary of the Exhibit

PASTEURIZATION OF FOAM

Milk plant operators and others interested in the proper pasteurizing of milk will be interested in an exhibit showing the importance of heating foam as well as the body of the milk during pasteurization. This exhibit shows that in over 80 per cent of the tests made the temperature of the foam was 5° F. or more lower than the corresponding milk; also that the bacterial count of the foam was considerably higher than that of the milk. It also shows that in two-thirds of the tests the bacterial count of the foam was, on an average, 176.3 per cent higher at the end of the holding period than it was at the beginning, whereas in every run the milk showed a decrease in count due to pasteurization. Better results were obtained in vats with tightly closed covers in comparison with those having loose or open covers.

Pasteurization as performed at the plants studied was not effective in raising the foam to a satisfactory pasteurizing temperature or in always accomplishing as great a destruction of bacteria in the foam as in the milk.

